Guidehouse
Outwit Complexity

DTE

Consumers Energy
Count on Us®

Home Energy Report Measure Calibration

Scope of Work

August 2023

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Overview

- The Home Energy Report (HER) measures in the Behavioral Reference Manual (BRM) were most recently calibrated and updated in the 2023 BRM. As parties have agreed to re-calibrate every 2 years, another calibration study is due to update the 2025 BRM.
- Similar to previous calibration studies, this study will:
  1. Calibrate **energy savings** values using regression analysis and relying on additional data that has become available since the last calibration study. Energy savings will be adjusted to account for program uplift.
  2. Calibrate **demand savings** using a demand savings factor. The demand savings factor will be updated relying on additional data that has become available since the last calibration study.

2023 BRM Values

- The BRM currently contains energy savings values† up to Year 11, but some usage bands have fewer years. The 2023 BRM energy savings are shown in the table below.
  - The Calibration Study will update values for which data is available, including proposing values where they do not currently exist.
- The 2023 BRM demand savings factor is 0.62 based on the previous calibration study and will be updated with available data. Multiplying values in the table below by 0.62 produces the demand savings values.

2023 BRM Energy Savings Values

Fuel Type	Usage Band	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Electric	5k-7k kWh	0.13%	0.63%	0.71%	0.76%	0.91%	0.85%	0.86%	1.00%	*	*	*
Electric	7k-9k kWh	0.75%	1.22%	1.23%	1.51%	1.65%	1.43%	1.98%	*	1.58%	1.48%	*
Electric	9k-11k kWh	0.76%	1.36%	1.52%	1.44%	1.25%	1.51%	1.67%	1.27%	*	0.95%	1.39%
Electric	11-13k kWh	0.75%	1.41%	1.63%	1.80%	1.52%	1.36%	1.87%	2.07%	*	*	*
Electric	>13k kWh	1.11%	1.89%	2.11%	2.05%	2.10%	2.06%	2.03%	1.68%	*	*	*
Gas	600-900 Therms	0.27%	0.35%	0.49%	0.47%	0.35%	0.42%	*	*	*	*	
Gas	900-1200 Therms	0.36%	0.54%	0.75%	0.79%	0.70%	0.74%	0.78%	0.59%	0.79%	0.89%	0.63%
Gas	>1200 Therms	0.41%	0.70%	0.66%	0.73%	0.72%	0.71%	0.93%	0.85%	*	*	

* The 2020 and 2022 Workpaper recommended that when a particular usage band/year combination is not in the BRM utilities should claim savings using the last year available in the BRM for that usage band. For example, if a wave in Year 7 was in the 600-900 therm usage band, the utility would claim the Year 6 value as the Year 7 value does not exist.

† Energy savings values include an adjustment for uplift into other programs of 6.4% for electric and 12.6% for gas.

Energy Savings Calibration

Data Available

The study will utilize data from all waves implemented by DTE (spanning 2010-2023) and SEMCO (spanning 2020-2023) and Consumers waves implemented prior to 2017 (spanning 2011- early 2015).

- Data from new Consumers waves will not be included in this study as Consumers claims custom savings for their current program.
- No weighting of the service areas is necessary as the entire program population for each utility is used in the calibration.

Waves first in Calibration Study in:			
2017	**2020**	**2022**	**2024**
CMS_201105_D	DTE_201602_D		
CMS_201203_D	DTE_201602_E		
CMS_201204_E_MUSK	DTE_201602_G		
CMS_201303_E	DTE_201606_D		
CMS_201305_D	DTE_201606_E		DTE_202201_D
DTE_201107_D	DTE_201610_G	DTE_202004_E	DTE_202201_G
DTE_201309_D	DTE_201710_D	SEGC_202011_G	SEGC_202202_G
DTE_201309_E	DTE_201710_G		SEGC_202208_G
DTE_201401_D	DTE_201711_G		
DTE_201401_E	DTE_201803_D		
DTE_201504_D	DTE_201803_G		
DTE_201504_E	DTE_201901_D		

Note: CMS_201204_E_BC, CMS_201203_G, and CMS_201403_D were excluded from previous studies because zip code data was not available to identify weather and will continue to be excluded from the current study.

Energy Savings Calibration

Methods

Guidehouse will estimate a regression model for each program year (i.e., Year 1, Year 2) and usage band for which data are available. The output of the model will yield per participant energy savings which we will convert into percent savings. These savings represent verified net savings before adjusting for program uplift.

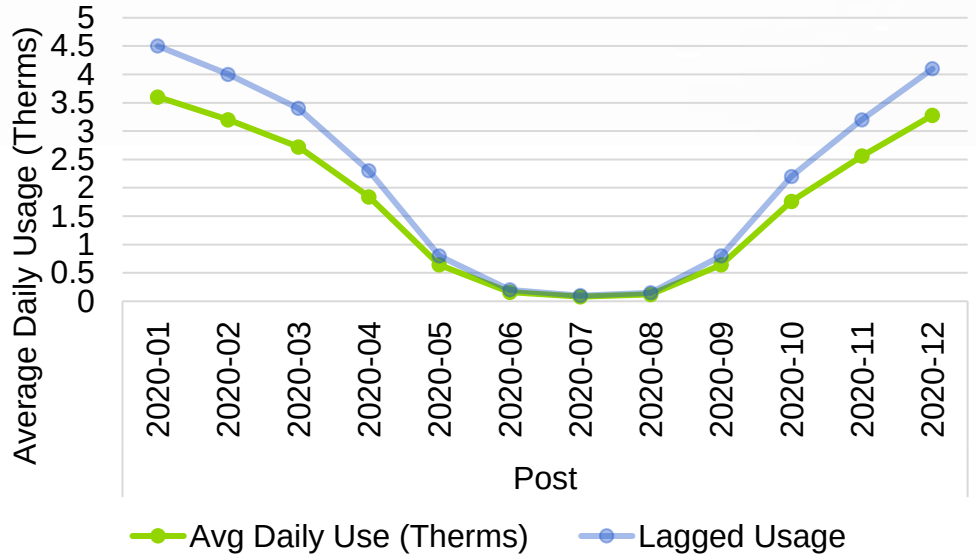
Guidehouse will use the lagged dependent variable (LDV) model specification, consistent with the previous two calibration studies.

LDV Model Specification

$$ADU_{it} = \sum_{J} \beta_{1j} YrMo_{jt} + \sum_{J} \beta_{2j} YrMo_{jt} \cdot \boldsymbol{ADUlag_{it}} + \beta_3 Treatment_i + \beta_4 CDD\_and\_or\_HDD_{it} + \sum_{W} \beta_5 Wave_{iw} + \beta_6 Utility_i + \varepsilon_{it}$$

- LDV controls for differences between the treatment and control groups by including lagged usage (from the pre-period) as an explanatory variable.
- The lagged usage does a good job of controlling for differences in usage over time.
- Time invariant customer characteristics must be explicitly added to the model to be accounted for. With a Randomized Control Trial (RCT) these characteristics are expected to be well-balanced between the treatment and control groups.

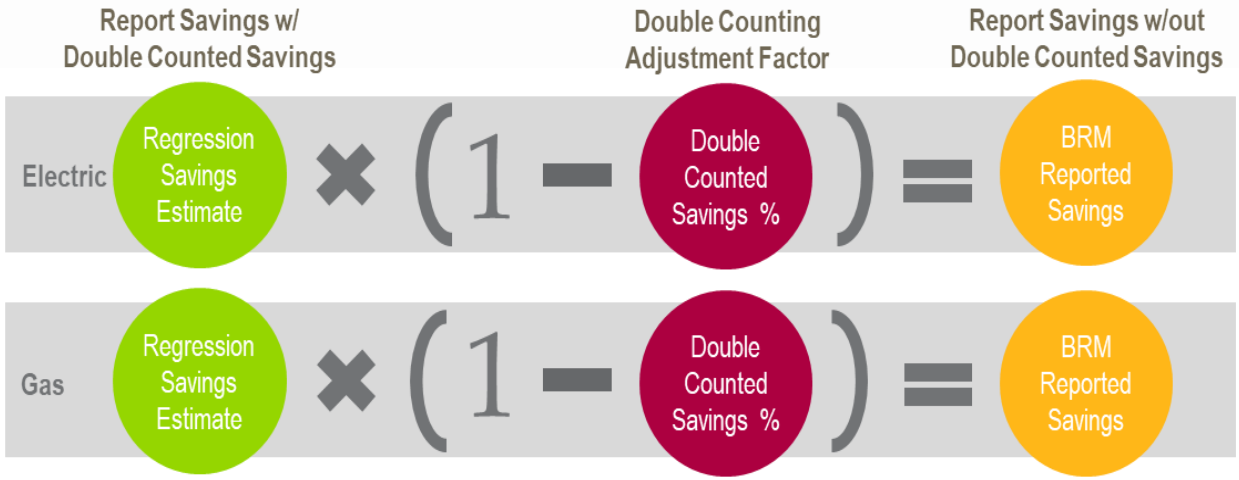
LDV Model Illustration



Note, the LDV model only includes unique observations of the dependent variable (average daily usage) for the post period and the pre-period enters as an independent variable (lagged usage). Thus, in estimating one year of savings, the model includes 12 observations.

Program Uplift

- The savings estimates resulting from the regression analysis may double-count savings if a customer participates in another Energy Waste Reduction (EWR) program because of the HER program. As a result, the calibration study will estimate savings from program uplift and subtract these savings from the HER program.
- The calibration study will calculate uplift for all DTE and SEMCO waves using a difference-in-difference (DID) statistic based on pre-period and post-period average savings from other energy efficiency programs. These estimates will be combined with uplift estimates from the prior Consumers Energy evaluations and weighted by the proportion of participants from each utility.
- The calibrated BRM values, adjusted for uplift, will be calculated using the following formulas:



Demand Savings Calibration

- The study will estimate a demand savings regression model for all waves with available AMI data and an analogous energy savings regression model for the same waves.
- The study will calculate a demand savings factor by comparing the demand savings to the energy savings using the following equation:

$$\text{Demand Savings Factor} = \frac{\%\ Demand\ Savings}{\%\ Energy\ Savings}$$

- The resulting demand savings factor will be used to calibrate *all* demand savings values in the BRM (all program years and usage bands).

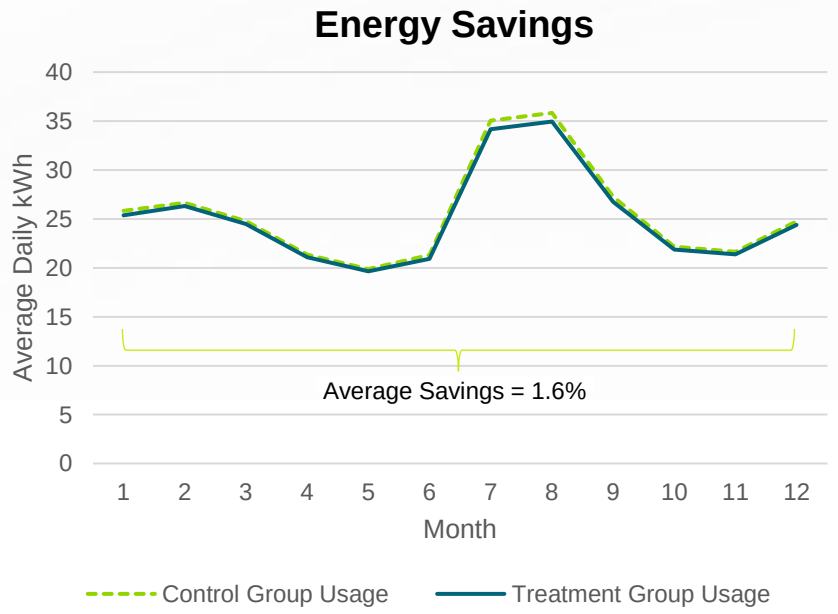
Demand Savings Calibration Waves

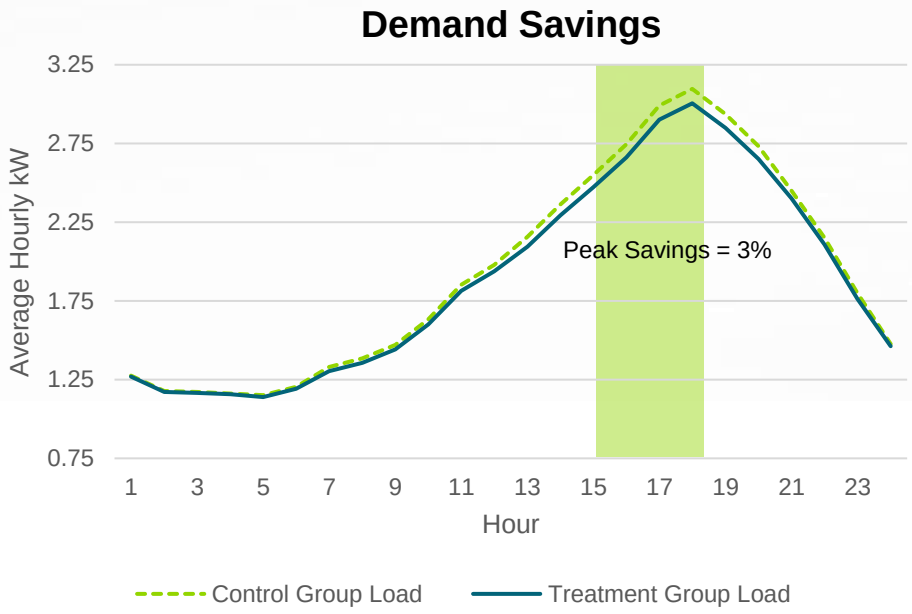
Wave	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
DTE_201602_D	X	X	X	X	*	X	X	X
DTE_201602_E	X	X	*	*	X	X	*	*
DTE_201606_D	X	X	X	X	X	X	X	X
DTE_201606_E	X	X	*	*	X	X	*	X
DTE_201710_D	X	X	X	X	X	X		
DTE_201803_D	X	X	X	X	X	X		
DTE_201901_D	X	X	*	X	X			
DTE_202004_D	X	X	X	X				
DTE_202201_D	X	X						

* Program year/wave combination excluded due to wave inactivity. Guidehouse counted program years from the wave start date regardless of wave activity.

Demand Savings Calibration

Example of Demand Savings Factor Calculation





Demand Savings Factor Calculation: $\frac{3\%}{1.6\%} = 1.9$

Timeline

Activity	Deliverables	Duration	Calendar
Scope Presentation to Collaborative	Presentation		Aug 2023
TASK 1: Energy Savings Calibration		3 months	Feb – May 2024
TASK 2: Program Uplift Calibration			
TASK 3: Demand Savings Factor Calibration			
TASK 4: Reporting		5 months	May – Sep 2024
4a. Results Presentation to Collaborative	Presentation		May 2024
4b. Workpaper Submission to BRM	Modified BRM Measure Workpaper		Jun 1
4c. Update BRM (Draft)	Modified BRM		Aug 1
4d. Update BRM (Final)	Modified BRM		Sep 15
4e. MPSC to Publish BRM			Oct 10
Total		8 months	Feb – Sep 2024

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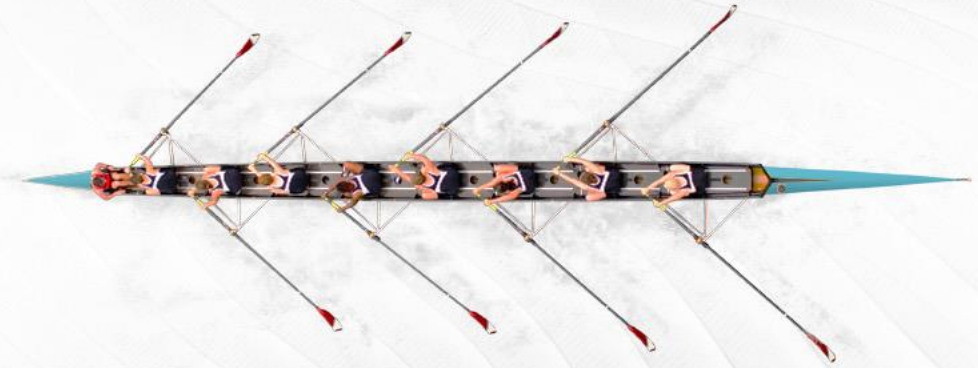

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